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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/681,618	10/08/2003	James A. Williams	27252-14	7286

7590 04/19/2006

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OIPE
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EXAMINER	
MCLEAN MAYO, KIMBERLY N	
ART UNIT	PAPER NUMBER
2187	

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/681,618	Applicant(s) WILLIAMS ET AL.	
	Examiner Kimberly N. McLean-Mayo	Art Unit 2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *December 29, 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Notice of References Cited	Application/Control No. 10/681,618	Applicant(s)/Patent Under Reexamination WILLIAMS ET AL.
	Examiner Kimberly N. McLean-Mayo	Art Unit 2187 · Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
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FOREIGN PATENT DOCUMENTS

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	10/681,618
Filing Date	10/08/03
First Named Inventor	James A. Williams
Art Unit	2187
Examiner Name	~~Not Yet Assigned~~ McLean, K.
Attorney Docket Number	27252-14

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
KNM		US- 6,587,881	07/01/2003	Agarwal et al.	
		US- 6,324,620	11/27/2001	Christenson et al.	
		US- 6,137,644	10/24/2000	Hetzler et al.	
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Examiner Signature		Date Considered	3/20/2006

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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L5: Entry 1 of 1 File: JPAB Dec 12, 1997

DOCUMENT-IDENTIFIER: JP 09321962 A
TITLE: IMAGE FORMING DEVICE

Abstract Text (2):

SOLUTION: Receiving the print data from a host device via a host interface 4, a print data expansion part 5 expands the print data into the data on bit images and stores them temporarily in an image memory 6. A compression/ expansion part 7 compresses the image data stored in the memory 6. A data storage control part 91 checks the importance of the image data compressed by the part 7. Then the part 91 stores the image data of high importance in a fast transfer area 21 of a hard disk device 2 and stores the image data of low importance in a slow transfer area 22 of the device 2 respectively. Thus, the image data of high importance can be transferred in a large quantity and within a fixed time in an inter-image data print mode.

Previous Doc Next Doc Go to Doc#

(19)日本国特許庁（ＪＰ）

(12) **公開特許公報**（Ａ）

(11)特許出願公開番号

特開平9－321962

(43)公開日　平成９年(1997)12月12日

(51)Int.Cl.⁶		識別記号	庁内整理番号	ＦＩ			技術表示箇所
Ｈ０４Ｎ	1/21			Ｈ０４Ｎ	1/21		
Ｂ４１Ｊ	2/51			Ｂ４１Ｊ	5/30	Ｚ	
	5/30				3/10	１０１Ｈ	

審査請求　未請求　請求項の数２　ＦＤ　（全　５　頁）

(21)出願番号　特願平8－152869

(22)出願日　平成８年(1996)５月27日

(71)出願人　000006747
株式会社リコー
東京都大田区中馬込１丁目３番６号

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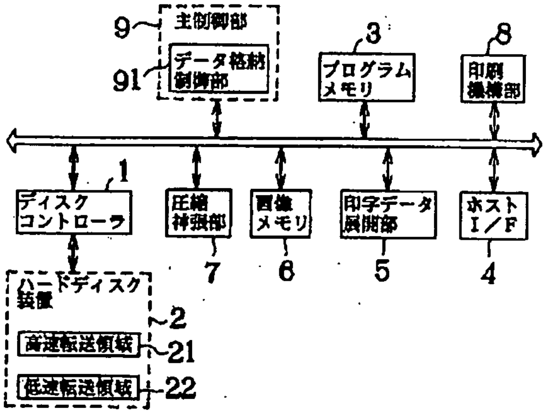
(74)代理人　弁理士　小島　俊郎

(54)【発明の名称】　画像形成装置

(57)【要約】

【課題】ハードディスク装置のデータ転送速度はアクセスするトラックが内周に近づくにつれて遅くなるため、ハードディスク装置をページプリント方式の画像形成装置のフレームメモリとして使用する場合、転送速度が遅い領域に記憶した画像データの転送を省略する場合がある。そこで、重要度の高い画像データを転送が速い領域に記憶して、重要度の高い再生画像が劣化することを防止する。

【解決手段】データ格納制御部９１はハードディスク装置２の記憶領域を転送速度別の記憶領域２１，２２に分割し、圧縮伸張部７が圧縮した重要度の高い画像データを転送速度の速い記憶領域２１に格納する。



【特許請求の範囲】

【請求項１】　複数ページ分の画像データを格納する大容量の不揮発性記憶装置を有し、大容量の不揮発性記憶装置に格納した画像データをページ単位に印刷する画像形成装置において、大容量の不揮発性記憶装置の記憶領域を転送速度別の複数の記憶領域に分割し、重要度の高い画像データを転送速度の速い記憶領域に格納することを特徴とする画像形成装置。

【請求項２】　上記大容量の不揮発性記憶装置にハードディスク装置を用いた請求項１記載の画像形成装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】この発明は画像形成装置、特に大容量の不揮発性記憶装置に格納した画像データをページ単位に印刷する画像形成装置における再生画像品質の向上に関するものである。

【０００２】

【従来の技術】画像データをページ単位に印刷するページプリント方式の画像形成装置としては、例えば特開平５-77483号公報に掲載された印字装置、特開平６-183070号公報に掲載された画像形成装置、特開平６-305203号公報に掲載された画像形成装置及び特開平５-77483号公報に掲載された印字装置等がある。

【０００３】特開平５-77483号公報に掲載された印字装置及び特開平６-183070号公報に掲載された画像形成装置では、印刷するデータの種類に応じて印刷速度を変えている。

【０００４】また、特開平６-305203号公報に掲載された画像形成装置ではページデータのバンド数の変更を印刷するページデータに応じて行い、効率的な印刷を行うようにしている。

【０００５】また、特開平５-557号公報に掲載された像形成装置及び特開平５-77483号公報に掲載された印字装置では、ビットマップイメージを展開するための時間がかかりバッファが空になるのを防ぐようにしている。

【０００６】ここで、ハードディスク装置の記録密度等の向上に伴いハードディスク装置のデータ転送速度が速くなってきているので、ハードディスク装置をページプリント方式の画像形成装置のフレームメモリとして使用することが考えられる。

【０００７】

【発明が解決しようとする課題】しかしながら、ハードディスク装置は一定速度で回転する円盤上の記憶媒体にデータを記憶するので、１トラック上のセクタ数は中心からの距離に応じて変動し、ハードディスク装置のデータ転送速度はアクセスするトラックが内周に近づくにつれて遅くなる。一方、ページプリント方式の画像形成装置は一定速度で印刷を行うため、印刷速度にあった一定速度で画像データを転送することが好ましい。

【０００８】圧縮率の高い画像データ、例えばテキスト画像データのあまり重要でない部分（主に高調波部分）のデータの転送を省略すると再生画像が違って見え、圧縮率の低い、例えば写真画像データ等のあまり重要でない部分のデータの転送を省略しても見た目があまり変わらないことから、印刷速度にあった一定速度で画像データを転送するために、例えば圧縮率の低い画像データのあまり重要でない部分のデータのうち転送が間にあわないデータの転送を省略する方法が考えられる。このため、ハードディスク装置をページプリント方式の画像形成装置のフレームメモリとして使用した場合に、画像データの重要な部分を高速で転送して、重要な部分の画像データに転送が間にあわなくなることを防止する必要がある。

【０００９】この発明はかかる問題を解消するためになされたものであり、データの重要度に応じてデータを格納する記憶領域を変えることにより印刷速度に応じた画像データ転送及び重要度が高い画像の正確な再生を図ることを目的とする。

【００１０】

【課題を解決するための手段】この発明に係る画像形成装置は、複数ページの画像データを格納する大容量の不揮発性記憶装置を有し、大容量の不揮発性記憶装置の記憶領域を転送速度別の複数の記憶領域に分割し、重要度の高い画像データを転送速度の速い記憶領域に格納し、重要度に応じて不揮発性記憶装置の各記憶領域に格納した画像データをページ単位に印刷して、印刷速度に応じた画像データ転送及び重要度が高い画像の転送省略を防止し、重要度が高い画像の正確な再生をする。

【００１１】さらに、上記大容量の不揮発性記憶装置にハードディスク装置を用いて、不揮発性記憶装置の費用を低減する。

【００１２】

【発明の実施の形態】この発明の画像形成装置は、複数ページの画像データを格納するフレームメモリとして大容量の不揮発性記憶装置、例えばハードディスク装置を有し、画像データを圧縮しハードディスク装置に格納し、格納した画像データをページ単位に伸張して印刷するページプリント方式の画像形成装置である。ここで、ハードディスク装置は一定速度で回転する円盤状の記憶媒体にデータを記憶するので、１トラック上のセクタ数は中心からの距離に応じて変動し、ハードディスクのデータ転送速度はアクセスするトラックが内周に近づくにつれて遅くなる。そこで、画像形成装置はハードディスク装置等の大容量の不揮発性記憶装置の記憶領域を転送速度別の複数の領域に分割し、画像データの重要度に応じて記憶領域を選択し、ハードディスク装置に格納した画像データをページ単位に伸張し印刷して、印刷速度に応じた画像データ転送及び重要度が高い画像の転送省略を防止し、重要度が高い画像の正確な再生をするものである。

【００１３】画像形成装置は、例えばディスクコントローラ、ハードディスク装置、プログラムメモリ、ホストインターフェイス、印刷データ展開部、画像メモリ、圧縮伸張部、印刷機構部及び主制御部を有する。ディスクコントローラはハードディスク装置を制御し、圧縮した画像データ等をハードディスク装置に格納する。ハードディスク装置は記憶領域として、例えば高速転送領域と低速転送領域を備える。高速転送領域は円盤状の記憶媒体の中心から遠い部分であり、低速転送領域は円盤状の記憶媒体の中心に近い部分である。プログラムメモリは主制御部の制御プログラム等を格納する。ホストインターフェイスは、例えばホスト装置との通信を制御し、ホスト装置から印刷データ等を受信する。印刷データ展開部はホストインターフェイスを介して受信した印刷データをビットイメージの画像データに展開する。画像メモリは印刷データ展開部が展開した画像データを一時的に格納する。圧縮伸張部は画像データを、例えばブロック単位で圧縮伸張する。印刷機構部はハードディスク装置に格納した画像データを印刷出力する。主制御部は画像形成装置全体の制御をする部分である。また、主制御部は、例えばデータ格納制御部を有する。データ格納制御部は圧縮伸張部が圧縮した画像データの格納先を格納する画像データの重要度に応じて選択する。例えば、画像データの重要度が高い場合は格納先としてハードディスク装置の高速転送領域を選択し、画像データの重要度の低い場合は格納先としてハードディスク装置の低速転送領域を選択する。これにより、一定時間内における重要度が高い画像データの転送量を多くすることができ、圧縮率が低く且つ重要度が高い画像データの一部の転送を省略することを防止する。

【００１４】

【実施例】図１はこの発明の一実施例の画像形成装置の構成図である。図に示すように画像形成装置は、ディスクコントローラ1、ハードディスク装置２、プログラムメモリ３、ホストインターフェイス（以後「ホストＩ／Ｆ」という。）４、印刷データ展開部５、画像メモリ６、圧縮伸張部７、印刷機構部８及び主制御部９を有する。

【００１５】ディスクコントローラ1はハードディスク装置2を制御し、圧縮した画像データ等をハードディスク装置２に格納する。ハードディスク装置２は、例えば、図２に示すように高速転送領域２１と低速転送領域２２を備える。高速転送領域２１は円盤状の記憶媒体の中心から遠い部分であり、低速転送領域２２は円盤状の記憶媒体の中心に近い部分である。プログラムメモリ３は主制御部９の制御プログラム等を格納する。ホストＩ／Ｆ４は、例えばホスト装置（不図示）との通信を制御し、ホスト装置から印刷データ等を受信する。印刷データ展開部5はホストＩ／Ｆ４を介して受信した印刷データをビットイメージの画像データに展開する。画像メモリ６は印刷データ展開部５が展開したビットイメージの画像データを一時的に格納する。圧縮伸張部７は画像メモリ６に格納した画像データを、例えばブロック単位で圧縮する。また、圧縮伸張部７はハードディスク装置２に格納した圧縮画像データを伸張して印刷機構部８に送る。印刷機構部８は圧縮伸張部７が伸張した画像データを印刷出力する。主制御部９は画像形成装置全体の制御をする。また、主制御部９は、例えばデータ格納制御部９１を有する。データ格納制御部９１は圧縮伸張部７が圧縮した画像データの格納先を格納する画像データの重要度に応じて選択する。例えば、画像データの重要度が高い場合はハードディスク装置２の高速転送領域２１に格納し、画像データの重要度の低い場合はハードディスク装置２の低速転送領域２２に格納する。

【００１６】上記構成の画像形成装置が、印刷データを受信してからハードディスク装置２に格納するまでの動作を、図３のフローチャートを参照して説明する。

【００１７】ホストＩ／Ｆ４を介してホスト装置から印刷データを受信すると（ステップＳ１）、印刷データ展開部5は受信した印刷データをビットイメージの画像データに展開し、画像メモリ６に一時的に格納する（ステップＳ２）。圧縮伸張部7は画像メモリ６に格納した画像データを圧縮する（ステップＳ３）。データ格納制御部９１は圧縮伸張部７が圧縮した画像データの重要度を調べ（ステップＳ４）、画像データの重要度が高い場合には、画像データをハードディスク装置２の高速転送領域２１に格納し（ステップＳ５）、画像データの重要度が低い場合には、画像データをハードディスク装置２の低速転送領域２２に格納する（ステップＳ６）。これにより、画像データ印刷の際に重要度の高い画像データを一定時間内に多く転送できるようになり、重要度の高い画像データを原画と違って再生することを防止できる。

【００１８】なお、圧縮伸張部7は重要度に応じて画像データの圧縮率を変えても良い。

【００１９】また、図4に示すように印刷速度及び印刷モード等に応じて閾値ｃを定め、圧縮した画像データの大きさが閾値ｃ以上か否かを調べ、圧縮した画像データの大きさが閾値ｃに満たない場合には全てのデータをハードディスク装置２の高速転送領域２１に格納し、圧縮した画像データの大きさが閾値ｃ以上の場合は閾値ｃ以下の部分を高速転送領域２１に格納し、閾値ｃ以上の部分を低速転送領域２２に格納しても良い。

【００２０】また、閾値ｃを境界線として閾値ｃを越えた部分の画像データを低速転送領域２２に格納するようにする代わりに、閾値ｃを越えたバンドの中で最も圧縮率が悪かったものの閾値ｃを越えた部分を基準にし、他の閾値ｃを越えたバンドにおいても最も圧縮率が悪かったものの閾値ｃを越えた部分と同じ画像データ量だけ低速転送領域２２に格納するようにしても良い。

【００２１】さらに、閾値ｃを越えた領域を有するバン

ドがいくつか続いた場合に、上記のように閾値ｃを越えたバンドの中で最も圧縮率が悪かったものの閾値ｃを越えた部分を基準に画像データを低速転送領域２２に格納するようにしても良い。

【００２２】また、実施例においてはハードディスク装置２の領域を高速転送領域２１と低速転送領域２２に分けたが、３つ以上の領域に分けても良い。

【００２３】

【発明の効果】この発明は以上説明したように、大容量の不揮発性記憶装置の記憶領域を転送速度別の複数の領域に分割し、重要度の高い画像データを転送速度の速い領域に格納し、大容量の不揮発性記憶装置の各記憶領域に格納した画像データを読み出して印刷するので、印刷速度に応じた画像データ転送ができると供に重要な画像データの転送省略を防止し重要な画像を正確に再生することができる。

【００２４】さらに、大容量の不揮発性記憶装置にハードディスク装置を用いたので、不揮発性記憶装置の費用を低減することができる。

【図面の簡単な説明】

【図１】この発明の実施例を示す構成図である。

【図２】転送速度とセクタアドレスとの関係を示す説明図である。

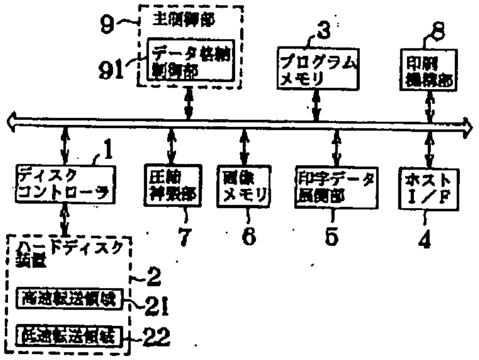
【図３】画像形成装置の動作を示すフローチャートである。

【図４】１頁分の画像データの構成図である。

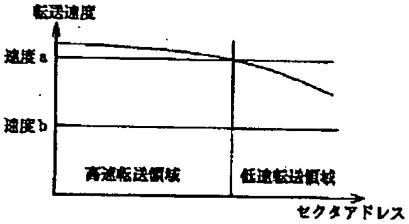
【符号の説明】

２	ハードディスク装置
２１	高速転送領域
２２	低速転送領域
５	印刷データ展開部
６	画像メモリ
７	圧縮伸張部
９１	データ格納制御部

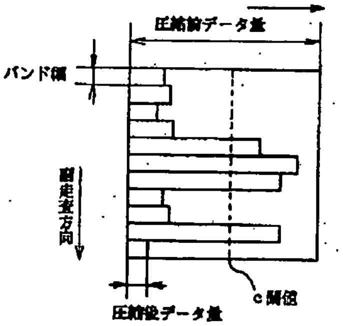
【図１】



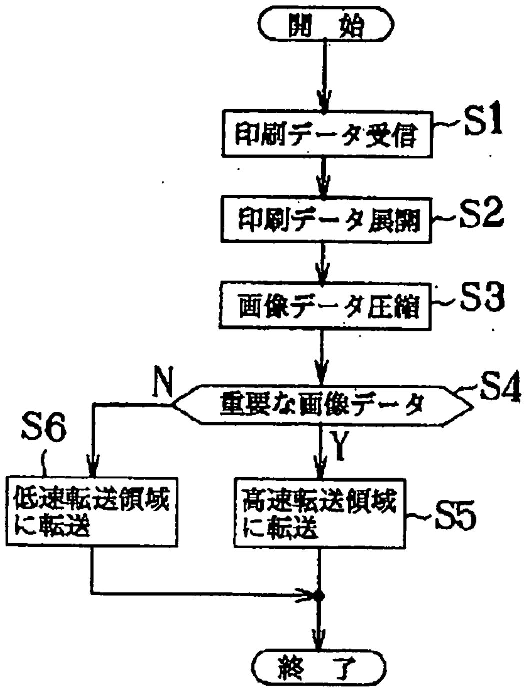
【図２】



【図４】



【図3】


開　始
印刷データ受信
S1
印刷データ展開
S2
画像データ圧縮
S3
重要な画像データ
S4
N
Y
S6
低速転送領域に転送
高速転送領域に転送
S5
終　了

DETAILED ACTION

1. The enclosed detailed action is in response to the Amendment submitted on December 29, 2005.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 25-33 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Independent claim 25 claims a computer readable medium. The specification indicates that the computer readable medium may be implemented as a transmission media, which can take the form of electromagnetic radiation, carrier wave/pulse and signals used to propagate instructions or other software over a network. These forms of media are not statutory subject matter.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2, 4-9, 13, 17-18, 20, 22-26, 29, 31, 33-35 and 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Holmes (USPN: 6,490,635).

Regarding claims 1, 25 and 34, Holmes discloses an access controller configured to control access to a storage device by metering access to data within a first region (outer region) within the storage device and by allowing unmetered access to data within a second region (inner region) within the storage device (C 1, L 49-62). Additionally, regarding claim 25, Holmes discloses the controller, which performs the above function, comprises hardware and software. It is evident that software is stored in a medium readable by the controller.

Regarding claims 2 and 33, Holmes discloses the system is embedded in one of a database system, an operating system and an application program ("associated firmware") configured to process access requests to storage (C 1, L 21-24).

Regarding claim 5 and 26, Holmes discloses the storage device comprising one or more disk drives (C 1, L 18-19).

Regarding claim 6, Holmes discloses the second region defined closer to the perimeter of the disk (inner region) than the first region (C 1, L 49-62).

Regarding claim 7, Holmes discloses the first and second regions defined by one or more logical block addresses (inherent; disk memory address are given virtual memory address/logical block addresses which are subsequently translated to a physical address which identifies a cylinder/track/sector).

Regarding claim 8-9, Holmes discloses the system embedded in a file system configured to process data input (write) and output (read) requests to the storage device (C 1, L 22-30).

Regarding claim 13, Holmes discloses receiving access requests to a storage device and increasing response time for access requests to a first region [inner region] within the storage device by metering access requests to a second region [outer region] within the storage device (C 1, L 49-62).

Regarding claims 17-18, Holmes discloses defining a plurality of regions within the storage device (inherent; disk drives are allocated and defined as logical block having corresponding logical block addresses); assigning a metering threshold (threshold is established by movement of the head) of the plurality of regions

Regarding claims 20 and 22-24, Holmes discloses a method comprising receiving I/O requests directed to a storage device (command queuing queues received requests, C 1, L 49-50); determining a priority level (high level for request to the inner region and lower level for request to the outer region) of each of the I/O requests (C 1, L 51-54); allowing I/O requests having a first priority level to be processed and limiting [delaying] I/O requests having a second priority level (C 1, L 51-62).

Regarding claim 29, Holmes discloses limiting a number of the access requests to the first region from being processed (the data corresponding to the higher priority request is allowed while the lower priority requests are delayed and thus limited).

Regarding claim 31, Holmes discloses defining at least the first region and the second region within the storage device (inherent; in order for the controller to determine if a request is directed to the inner region or the outer region, the system/controller must know what addresses corresponds to these two regions to determine whether the request has a high priority).

Regarding claims 35, Holmes discloses allocation logic to configured to define a plurality of regions within the storage device (inherent; disk drives are allocated and defined as logical block having corresponding logical block addresses); threshold logic configured to assign a metering threshold (threshold established by movement of the head) to one or more selected regions (overlap regions) of the plurality of regions; and an access controller including logic configured to meter (lower priority) access requests to a selected region of the plurality of regions once a metering threshold for the selected region is met (when the head is moved farthest from the selected region).

Regarding claim 37, Holmes discloses metering access request (C 1, L 49-62).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 10, 14, 19, 21 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holmes (USPN: 6,490,635) in view of Chamberlin et al. (PGPUB: US 2004/0223722). Regarding claims 10, 14, 19, 21 and 28, Holmes discloses the limitations cited above in claims 1, 13, 20 and 25 respectively, however, Holmes does not disclose metering accesses based on a threshold of access requests directed to data within the first region. Chamberlin teaches the concept of metering [deferring, restricting, pausing, delaying] accesses based on a threshold of access requests (section [0028]; Chamberlin discloses that write accesses have priority over read accesses; however, the system will deter from this process in an attempt to meet the deadlines of each I/O request; thus the threshold of access request would be the point where a low or lower level request deadline is about to expire). In the system taught by Holmes, accesses to the inner region of the storage have priority over accesses to the outer storage region. Holmes fails to include a mechanism to control the maximum delay time of a request to the outer region, which could be a long time, given the number of request to the inner region. One of ordinary skill in the art would have recognized such a shortcoming and would have been motivated to use Chamberlin's teachings in the system taught by Holmes for the desirable purpose of improving the performance of the system by ensuring that request to the outer regions of the storage are actually processed and within an adequate delay time.

6. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holmes (USPN: 6,490,635).

Holmes discloses the limitations cited above. Holmes does not explicitly disclose one or more tables configured to define at least the data in the first region to be metered and a data location; although it is evident that Holmes's system inevitably has to incorporate means to determine which data locations/addresses correspond to the first region [outer region] to determine/distinguish the inner region from the outer/inner region. However, it is well known in the art to use tables as an efficient way to organize information for controlling a disk storage device. Thus, it would have been obvious to one of ordinary skill in the art to use tables in the system taught by Holmes to configure/define data locations and the first region to be metered for the desirable purpose of efficiency.

7. Claims 3-4, 15-16, 27, 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holmes (USPN: 6,490,635) in view of Ogawara (JP: 09321962).

Holmes discloses the limitations cited above in claim 13, however, Holmes does not disclose determining a priority level of the data, storing metered data within the storage device based on a priority level of the data or determining whether selected data will be stored in the first or second region. Ogawara discloses storing data of high importance (priority level) within the fast region of the disk and storing data of low importance within the slow region (Abstract). It is evident that Ogawara's system has logic to determine the priority level of the data since the system distinguished high importance data from low importance data. This feature taught by Ogawara provides improved performance by allowing fast access to essential data. Hence, it would have been obvious to one of ordinary skill in the art to incorporate Ogawara's teachings in the system taught by Holmes for the desirable purpose of improved performance.

8. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holmes (USPN: 6,490,635) in view of Li et al. (USPN: 6,256,705).

Holmes discloses the limitations cited above, however, Holmes does not disclose placing selected data within a selected region of the plurality of regions based on a frequency of access to the selected data. Li teaches the concept of placing data within a particular logical cylinder in a selected region (hot or cold) based on a frequency of access to the data [via access to the cylinder] (C 6, L 22-34). This feature taught by Li improves the performance of the system by improving seek times. One of ordinary skill in the art would have recognized this benefit of Li's teachings and would have been motivated to incorporate such teachings in the system taught by Holmes for the desirable purpose of improved performance.

Response to Arguments

9. Applicant's arguments filed have been fully considered but they are not persuasive.

Regarding claim 1, the arguments presented by the Applicant argue the invention more narrowly than claimed. The Applicant asserts the following:

The Applicant asserts that the Holmes does not teach metering access to a first region and not metering access to a second region. Applicant's specification provides that metering [w.r.t. the cold region] may occur by giving priority to hot accesses [which are accesses to a particular region of the storage device] (refer to section [0025]). This type of metering is synonymous with the metering performed in Holmes' system, wherein priority is given to accesses to the current head region (C 1, L 49-62).

The Applicant asserts that Holmes metering is not control but selection. As noted above, Holmes' metering is done by giving priority to accesses to a region of the storage. The Applicant discloses in the specification that metering may be performed in such a manner and thus any distinction the Applicant is trying to make is not clear from the arguments provided or the claims.

Additionally, the Applicant asserts that all requests in Holmes' system are metered; the Examiner disagrees. The metering in Holmes' system is done by giving priority to requests to a given region Hence, the region with the higher priority, which is the region near the head is unmetered since no other request have a higher priority and thus such requests are not delayed/restricted/limited. The other regions having a lower priority are metered.

The Applicant asserts that Holmes' metering is not exercised based on whether an access is associated with a pre-defined region like a hot region or cold region; such an assertion is incommensurate with the claims.

It should be noted that claims are examined given a broadest reasonable interpretation. The Applicant has asserted that Holmes metering is based on proximity to a current head position, such that priority is given to accesses in the middle if the head is in the middle, priority is given to accesses near the hub if the head is near the hub and priority is given to accesses near the perimeter if the head is near the perimeter. The Applicant should note that such an assertion corresponds to the Examiner's position in that the middle area, near the perimeter area and near the hub area are all regions wherein any one of the may represent the metered region depending on where the hub is. The Applicant appears to argue the claims more narrowly that actually presented in the application. The claim makes no mention of predefined static regions

Regarding claim 2, Holmes teaches specifically that the controller is hardware and associated firmware (C 1, L 22-25). Hardware components such as controllers and processors are controlled by software and thus it is evident that the operation/control of the controller is embedded in the software.

Regarding claims 3-4, arguments are moot in view of new rejection.

Regarding claim 5, Holmes clearly teaches the storage device having one or more disk drives (C 1, entire). Holmes does not just talk about disk drives but specifically talks about metering request to one region and while allowing unmetered access to another (explained above regarding claim 1).

Regarding claim 6, the Applicant asserts that Holmes teaches away from the claimed invention in that it describes giving priority to a region closer to the hub. However, Holmes provided such as an example to illustrate how the reordering/priority would occur when the head is near the hub. However, as pointed out by Applicant, the first and second region changes dynamically according to the location of the head and thus when the head is closer to the perimeter, requests to the inner region (region near the hub) will be the metered region and thus the first region.

Regarding claim 7, the regions accessed in Holmes' system are accessed via a logical block address. Thus when the requests are prioritized, the corresponding block addresses of the requests demarcate the regions (first or second) consistent with its priority level. For example, the logical block address corresponding to the request with the highest priority level (at the top of the queue) defines the second region.

Regarding claim 8, a file system is software that translates requests for file operations from an application program into low-level, sector-oriented tasks that can be understood by the drivers controlling the disk drives. Holmes discloses that the controller comprises hardware and software that interfaces to the host and controls the transfer of data between the disk drive and the controller. Thus is it evident that the controller also comprises a file system.

Regarding claim 9, the requests in Holmes' system are disk access requests, which includes read (output request) and write operation (input request).

Regarding claim 13, refer to arguments above with respect to claim 1.

Applicant's arguments concerning claims 15 and 16 are moot in view of the new rejection provided above.

Regarding claims 17-18, as noted in the aforementioned argument for claim 7, the regions are defined by the priority level of the addresses corresponding to the request in the command queue; additionally a threshold is simply a point (in time) when something will take place. In the instant case, the threshold is assigned whenever the head is moved; thereby establishing the priority regions.

Regarding claim 20, Holmes teaches prioritizing requests via re-ordering; thus each request has a priority level determined by its ordering position in the command queue. The data corresponding to the higher priority request is allowed while the lower priority requests are delayed and thus limited.

Regarding claim 22, in Holmes' system the priority level of a request is determined based on the location of data with respect to the location of the head.

Regarding claim 23, the Applicant asserts that Holmes teaches away from the claimed invention in that it describes giving priority to a region closer to the hub. However, Holmes provided such as an example to illustrate how the reordering/priority would occur when the head is near the hub. However, as pointed out by Applicant, the first and second region changes dynamically according to the location of the head and thus when the head is closer to the perimeter, requests to the inner region (region near the hub) will be the metered region and thus the first region.

Regarding claim 24, the relative position of the request is of course determined by the address of the request with respect to the location of the head, which is indicated by an address.

Regarding claims 25 and 34, refer to the above arguments with respect to claim 1.

Regarding claim 26, refer to the above arguments with respect to claim 5.

Regarding claim 29, the data corresponding to the higher priority request is allowed while the lower priority requests are delayed and thus limited.

Regarding claims 27, 30 and 32, arguments are moot in view of the new rejection.

Regarding claim 31, refer to above arguments with respect to claim 7.

Regarding claim 33, refer to above arguments with respect to claim 8.

Regarding claim 35, the recitation the database has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Regarding claim 37, Holmes' metering is done by the controller giving priority to certain requests/accesses to a region of the storage.

Regarding claims 10, 14, 19, 21, and 28-29, the threshold value is the number of requests processed prior to deadline of expiration for a lower level request.

Regarding claims 11-12, as noted above, it is evident that Holmes's system inevitably has to incorporate means to determine which data locations/addresses correspond to the first region [outer region] to determine/distinguish the inner region from the outer/inner region. However, it is well known in the art to use tables as an efficient way to organize information for controlling a disk storage device. Thus, it would have been obvious to one of ordinary skill in the art to use tables in the system taught by Holmes to configure/define data locations and the first region to be metered for the desirable purpose of efficiency. Holmes' system already determines the regions and thus the use of the table would simply store the defined regions for efficiency.

Regarding claim 36, the claim calls for placing data in a selected region based on a frequency of access to the selected data. The claim does not speak of metering data. As noted above in the rejection, Li is relied upon for teaching placing data within a particular logical cylinder in a selected region (hot or cold) based on a frequency of access to the data [via access to the cylinder] (C 6, L 22-34). Hence, the combined teachings of Holmes and Li teach the claimed invention.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly N. McLean-Mayo whose telephone number is 571-272-4194. The examiner can normally be reached on Mon, Wed, Thurs (10-4), Tues (9:45 - 6:15).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 571-272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KIMBERLY MCLEAN-MAYO
PRIMARY EXAMINER

Kimberly N. McLean-Mayo
Primary Examiner
Art Unit 2187

KNM

March 20, 2006